

**METHOD AND LASER SYSTEM CONTROLLING BREAKDOWN PROCESS  
DEVELOPMENT AND SPACE STRUCTURE OF LASER RADIATION FOR  
PRODUCTION OF HIGH QUALITY LASER-INDUCED DAMAGE IMAGES**

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**ABSTRACT OF THE INVENTION**

Embodiments of methods and an apparatus for creating points or areas of laser-induced damage inside a transparent material are disclosed. One or more embodiments of the invention comprise a method and system for producing etch points by control of breakdown process development. In one embodiment, at the beginning an applied laser radiation level just exceeds an energy threshold for creating a plasma condition in the material, and thereafter the energy level of the applied laser radiation is just maintain the plasma condition and is applied before the plasma condition extinguishes, but after a shock wave associated therewith has passed. Other embodiments of the invention comprise a method and a system for producing etch points by controlling a space structure of laser beam. According to the invention a laser generates a  $TEM_{mn}$  radiation. The values of the integers m and n are controlled and determined so as to reproduce particular gray shades for a particular point of an image. Points or areas of laser-induced damage produced by these methods do have the traditional and undesirable star configuration. Furthermore, it is possible to control the brightness of these points without changing their size.

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